

ABSTRACT

A photonic crystal fiber (PCF) preform, from which a photonic crystal fiber is manufactured, includes a rod-shaped substrate with holes longitudinally formed therethrough in a photonic lattice structure, and material layers having at least two different indices of refraction. The material layers are disposed in the holes, respectively. Distribution of index of refraction of the photonic crystal fiber preform is controlled by arrangement of the material layers. Consequently, an optical fiber with very low optical loss, very low optical nonlinearity and excellent transmission characteristics can be easily manufactured, and an optical fiber with various characteristics, differing depending upon the lattice structure, can be realized.